

1 372 412

- (21) Application No. 8552/71 (22) Filed 2 April 1971
 (23) Complete Specification filed 30 March 1972
 (44) Complete Specification published 30 Oct. 1974
 (51) International Classification F16K 31/60; B60T 15/04, 17/16
 (52) Index at acceptance
 F2F 1B1A
 F2E 2G1
 F2V D2 M3D N3
 (72) Inventor MICHAEL JAMES HUGHES



(54) IMPROVEMENTS IN OR RELATING TO FLUID PRESSURE
 CONTROL VALVE MEANS

(71) We, GIRLING LIMITED, a British Company of Kings Road, Tyseley, Birmingham 11, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to control valve means particularly, but not exclusively, suitable for use in fluid pressure braking systems in which fluid pressures are supplied separately to a service brake actuator (such as a wheel cylinder) and to a lock unit for holding the brake applied mechanically and having a fluid pressure motor for releasing the lock. Such an arrangement is described, for example in the complete specification of our British Patent No. 1245985. If the lock unit comprises resilient means for protecting the lock against mechanical overload in the "applied" condition, it is desirable to protect the resilient means themselves against excessive deflection and loading, and the present invention is concerned with a "gate" type of control valve means for this purpose.

In accordance with the present invention, there is provided a fluid pressure control valve means comprising two separate control valves for regulating the pressure in separate pressure systems, a common operating lever for controlling the respective valves and a gate constraining movements of the lever, wherein the gate has a first and second parallel legs, movement of the lever along either of which varies the setting of one control valve, and first and second cross-paths transverse to and interconnecting the two legs, movement of the lever along either of which cross-paths varies the setting of the other control valve, and one-way latching means positioned to prevent movement of the lever from one end of the second leg into the first leg except through the second cross-path

which is positioned intermediate the ends of the legs.

Preferably, a second latching means prevents movement of the lever from the first leg into the second leg except through the first cross-path.

When incorporated in a vehicle braking system of the form first mentioned, the control means ensures that the lock unit is only applied at a predetermined high pressure, and only released at a predetermined lower pressure.

One form of control valve means in accordance with the invention is described below, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a perspective view of the control valve means; and

Figure 2 is a diagrammatic view of the gate and latching means.

The control valve means comprises two separate control valves 10 and 11 arranged to be operated by a common control lever 12, movement of which is constrained by a gate 13. The gate restricts movement of the lever to movements in one direction to vary the setting of valve 10 between zero pressure and a maximum pressure and movement in a transverse direction to open and close the control valve 11. The valves are of any suitable type known *per se*, each being responsive to an angular or a rectilinear displacement of its actuating member.

In use, control valve 10 is connected in a pressure line between a pressure source and one or more brake actuators, such as wheel brake cylinders, and valve 11 between a pressure source and a lock actuator unit for holding one or more wheel brakes applied mechanically.

Referring now to Figure 2, movement along a main leg 1 from A to C effects a progressive pressure rise through the actuator control valve 10 from zero to the maximum available pressure, say 2,000 p.s.i. A second parallel leg 2 controls a pressure

range from zero at E to a pressure below the maximum, say 1760 p.s.i. at D.

Pressure through the lock unit control valve 11 is varied by movement of the control lever along either of two parallel cross paths 3 and 4, from zero at D and F, to predetermined maximum pressure at B and G. Mechanical one-way latching devices 5 and 6 are included at F and G, so that the control lever can only be moved to relieve the lock motor pressure along the path B, D at an actuator pressure of 1760 p.s.i. and lock motor pressure is restored by movement of the lever from F to G, at an actuator pressure of 1300 p.s.i. Each latching means conveniently comprises a swinging arm lightly spring biased against a stop so as to extend across the respective leg or cross-path of the gate. The latch is readily swung away from the stop when engaged by the lever 12 from one side; but blocks the lever against movement in the opposite direction.

In use, the control lever is normally at point A, so that the lock motor is pressurised to prevent the lock from coming into operation. To park the vehicle, the lever is moved to point B, to apply 1760 p.s.i. to the actuator, and then to D to exhaust the lock motor. The actuator pressure is then relieved by moving the lever from D to E. Due to relaxation in the lock mechanism, the effective load exerted by the lock unit is just less than that corresponding to an actuator pressure of 1300 p.s.i. but in excess of the initial pre-load of the resilient means of the lock unit. To release the lock, the lever is moved from E to F, (where it is checked by the non-return gate), thus supplying pressure at 1300 p.s.i. to the actuator to relieve the lock of load, and then from F to G to restore normal operating pressure to the lock motor, releasing the lock.

The non-return gate at G thus prevents a parking operation with insufficient parking brake effort.

WHAT WE CLAIM IS:—

1. Fluid pressure control valve means comprising two separate control valves for

regulating the pressure in separate pressure systems, a common operating lever for controlling the respective valves and a gate constraining movements of the lever, wherein the gate has first and second parallel legs, movement of the lever along either of which varies the setting of one control valve, and first and second cross-paths transverse to and interconnecting the two legs, movement of the lever along either of which cross-paths varies the setting of the other control valve, and one-way latching means positioned to prevent movement of the lever from one end of the second leg into the first leg except through the second cross-path which is positioned intermediate the ends of the legs.

2. Control valve means as claimed in claim 1, comprising a second one-way latching means positioned to prevent movement of the lever from the first leg into the second leg except through the first cross-path.

3. Control valve means as claimed in claim 2, wherein the gate and latching means are substantially as herein described with reference to the accompanying drawings.

4. Control valve means in accordance with claim 2 or 3 when incorporated in a fluid pressure vehicle braking system, and wherein the one control valve is arranged to control operation of a service brake actuator, and the other valve is arranged to control operation of a lock unit for holding one or more brakes applied mechanically, the lock unit being applied by release of pressure from the unit, and wherein the said first and second latching means serve to ensure that the lock unit can be applied only at a predetermined high pressure in the service braking system and released only at a predetermined lower pressure.

A. A. THORNTON & CO.,
Chartered Patent Agents,
Northumberland House,
303—306 High Holborn,
London, W.C.1.

